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METATHESIS AND DAHL'S LAW IN EKEGUSII*

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In Ekegusii, a Kenyan Bantu language, certain synchronic data are argued to motivate a diachronic process of metathesis which is shown to affect two consonants, the first of which must be a voiced velar, over an intervening vowel. It is further shown that this process only occurs if there is a labial consonant which follows the voiced velar somewhere in the word. In some cases the voicing of the velar which undergoes metathesis is derived by a historical voicing dissimilation rule known as Dahl's law. However, this process appears to have applied in some reflexes of *kVp, but not others. While it is well known that primary place of articulation considerations often help to determine which consonants can undergo or trigger Dahl's law, it is argued here that to explain which *kVp sequences undergo Dahl's law and which don't, the secondary place of articulation of a consonant can also play a role.

1. Introduction

Ekegusii is a Bantu language (Guthrie E-42) spoken by some one and a half million speakers in and around the city of Kisii in southwestern Kenya. I will present data which I will argue is best accounted for by positing a diachronic process of metathesis. Unlike many instances of metathesis which affect two adjacent sounds, the metathesis in Ekegusii operates over a vowel, i.e., it changes certain C_1VC_2 sequences into C_2VC_1 . The description of this process and its relation to other historical sound changes, particularly Dahl's law, will be the central focus of this paper.

2. Background and presentation of data to be accounted for

The classification of Ekegusii according to Guthrie 1967 is given in (1). Its classification according to Ethnologue and Nurse 1979) is given in (2) and (3) respectively. (Subgroup names are in SMALL CAPS.)

(1) GUTHRIE'S ZONE E

NYORO-GANDA: Nyoro (E.11), Tooro (E.12), Nyankore (E.13), Ruciga (E.14), HAYA-JITA: Kinyambo (E.21), Haya (E.22), Jinja (E.23), Kerewe (E.24), Jita (E.25)

MASAMBA-LUHYA: Masaba, Gisu, Bukusu (E.31), Luhya, Hanga (E.32), Nyore (E.33), Saamia (E.34), Nyuli (E.35)

RAGOLI-KURIA: EKEGUSII (E.42), Logooli (E.41), Kuria (E.43), Zanaki (E.44), Nata (E.45), Sonjo (E.46)

KIKUYU-KAMBA: Kikuyu (E.51), Embu (E.52), Meru (E.53), Tharaka (E.54), Kamba (E.55), Daiso/Segeju (E.56)

CHAGA: Rwo (E.61), Chaga, Hai, Wunjo, Rombo (E.62), Rusha (E.63), Kahe (E.64), Gweno (E.65)

NYIKA-TAITA: Pokomo (E.71), Nyika, Giryama, Kauma, Conyi, Duruma, Rabai (E.72), Digo (E.73), Taita (E.74)

(2) ETHNOLOGUE'S CENTRAL ZONE "E" (follows Guthrie 1971)

KURIA (largely E.40): EKEGUSII, Ikizu, Ikoma, Kabwa, Kuria, Ngurimi, Sikazi, Sonjo, Suba, Ware, Zanaki

KIKUYU-KAMBA (largely E.50): Meru, Mhaiso, Embu, Gikuyu, Kamba

CHAGA (largely E.60): Chaga, Gweno, Kahe, Mosi, Rusha, Rwo

NYIKA (largely E.70): Chonyi, Digo, Duruma, Giryama, Malakote, Pokomo, Sagalla, Taita

(3) LACUSTRINE

LUHYA

N. Luyia: Saamia (E.34), Masaaba (E.31)

S. Luyia: Isuxa, Logooli (E.41)

EAST NYANZA/SUGUTI

SUGUTI: Jita (E.25), Kwaya (E.25), Ruri, Tegi

EAST NYANZA

EKEGUSII (E.42)

Kuria (E.43), Zanaki (E.44), Nata (E.45), Ngurimi, Shashi

INTER-LACUSTRINE

NORTH NYANZA: Ganda (E.15), Soga (E.16), Swere

RUTARA: Nyoro (E.11), Tooro (E.12), Chiga (E.14), Nyankore (E.13), Haya (E.22), Zinza (E.23), Nyambo (E.21), Kerewe (E.24)

WESTERN HIGHLANDS: Rundi (D.62), Rwanda (D.61), Ha (D.66), Vinza (D.65), Hagaza (D.65), Shubi (D.64)

The (phonemic) consonant and vowel inventories of Ekegusii are given in (4) and (5) respectively.

(4)	t		k
	b	d	g
		č	
	s		
	m	n	ŋ

(5)	i		u
	e		o
	ε		ɔ
		a	

Synchronically, the three voiced stops [b,d,g] all alternate regularly with [β,r,ɣ] respectively, the former found after a nasal, while the latter are found word-initially or post-vocally.¹

- (6)
- | | | |
|----|------------------|-------------|
| a. | ɔ̃-rò-βéèrè | 'breast' |
| | chíí-m-βéèrè | 'breasts' |
| b. | ɔ̃-kò-róòt-à | 'dream' (v) |
| | chíí-n-dóòt-ò | 'dream' (n) |
| c. | ó-rò-ɣùunchára | 'horn' |
| | chíí-ŋ-gùunchára | 'horns' |

The Proto-Bantu segment inventory given by Guthrie 1967 is listed in (7) and (8) for consonants and vowels respectively.² (Modern Ekegusii reflexes, where they uniformly differ from the proto-sounds, are shown to the right.)

- (7)
- | | | |
|--------|--------|----|
| *p > Ø | *t | *k |
| *b | *d | *g |
| | *c > s | |
| | *j > č | |
| | *y | |
| *m | *n | *ŋ |

- (8)
- | | |
|--------|--------|
| *j > i | *y > u |
| *i > e | *u > o |
| *e > ε | *o > ɔ |
| *a | |

Examples of the historical sound changes are given for vowels and consonants in (9) and (10) respectively.

- (9) SOUND CHANGE EXAMPLES
- | | |
|--------|--|
| *j > i | éè-n-gì 'fly' < *gì; á-mà-rìβà 'pool' < *dìbà |
| *i > e | ó-βò-βé 'evil' < *bí; é-ɣè-té 'stick' < *tí |
| *e > ε | ɔ̃-kò-ɣèènd-à 'go' < *gènd; á-mà-βéèrè 'milk' < *béédè |
| *y > u | rí-βú 'ashes' < *bú; ó-kò-rùm-à 'roar' < *dùm |
| *u > o | ó-kò-ɣòrò 'foot' < *gùdù; é-ngòmà 'wound' < *gùmà |
| *o > ɔ | ɔ̃-kò-róòt-à 'dream' < *dóót; rí-ròβà 'soil' < *dòbà |
| *a > a | á-mà-rìβà 'pool' < *dìbà; é-ngòmà 'wound' < *gùmà |

- (10)
- | | |
|------------------|--|
| *p > Ø | ɔ̃-kò-ér-á 'be finished' < *péd; á-mà-éémbá 'sorghum' < *pémbá |
| *t > t | ɔ̃-kò-róòt-à 'dream' < *dóót; é-ɣè-té 'stick' < *tí |
| *k > k | ó-mò-kérà 'tail' < *kídà; ó-βò-túkò 'night' < *túkù |
| *b > b/N | é-m-bèβà 'rat' < *bìbà |
| *b > β (elsewh.) | á-mà-rìβà 'pool' < *dìbà; á-mà-βéèrè 'milk' < *béédè |
| *d > d/N | éè-n-dà 'stomach' < *dà; |
| *d > r (elsewh.) | ɔ̃-kò-róòt-à 'dream' < *dóót |

- *g > g/ N _ éè-n-gì 'fly' < *gì;
 *g > ɣ (elsewh.) ó-kò-ɣèènd-à 'go' < *gènd
 *c > s éè-n-sé 'country' > *cí; ó-kò-βís-á 'hide' > *bíc
 *j > č ó-rò-čárá 'fingernail' < *jádá; ó-mò-čì 'village' < *jì
 *y > y / N _ ó-kò-nyw-à 'drink' < *nyú; é-n-yàmà 'meat' > *yàmà
 *y > Ø (elsewh.) ó-'mw-ááná 'child' < *yánà; ó-ɣò-ítá 'kill' > *yít
 *m > m ó-kò-rùm-à 'roar' < *dùm; é-ngòmà 'wound' < *gùmà
 *n > n ó-kò-βún-á 'break' < *bun; ó-ɣò-káàn-à 'deny' < *káán
 *ŋ > ŋ é-ŋòðmbè 'cow' < *ŋòmbè

Let us now consider the forms for which I will argue that metathesis has applied historically. All the forms thus far discovered which exhibit this are given in (11).

- (11) a. ó-kò-βàɣà 'divide' < *gàb-a
 ~ ?ó-kò-ɣàβà
 b. mà-ròɣòðβà 'evening' < *gòdòbà
 ~ ?mà-ɣòròðβà
 c. é-kì-óɣé 'eyelash' < *kópé
 d. rí-'úɣá 'bone' < *kúpà

In (11a-b) the initial *gVC sequence has become CVɣ in an apparent metathesizing of the two consonants over the intervening vowel. I note here that while all three of my consultants use the forms whose roots begin with β and r, respectively, two of the three state that they have heard the form where the root begins with a ɣ and find it acceptable. Both felt this might be a dialectal difference.³ In (11c-d) the *kVp sequence has become Vɣ. (There is no variant pronunciation of these forms.) I will show below that some type of metathesis must be involved with these forms as well, since *k has k and ɣ reflexes in Ekegusii, but not Ø, and *p deletes in this environment.

3. Motivating metathesis

Let us first consider the forms in (11a-b). The first thing which should be pointed out is that Ekegusii is the only Bantu language of which I am aware where these forms exhibit a diachronic metathesis with respect to the Proto-Bantu forms. Given this fact and the variable pronunciation of (11a-b) we infer that in historical terms, this process is probably a relatively recent one. The following show the reflexes of these Proto-Bantu forms in languages fairly closely related to Ekegusii. None of them exhibit the metathesis evident in the forms in (11).⁴

(12) *gàb 'divide'

- | | |
|------------|--|
| a. gaβ | Nyoro (E.11), Nyankore (E.13) |
| b. ɣay | Kikuyu (E.51) |
| c. gaβɔr | Logori (E.41) |
| d. gab | Luganda (E.15) 'give away, divide' (Murphy 1972) |
| e. kaβ | Bukusu (E.31) (Mutonyi p.c.) |
| f. gabanya | Kirundi (D.62) (Stevick 1965) |

g. yaβ Kikuria (E.43) (Muniko 1996)

(13) *gòdòbà 'evening'

- a. umu-goroβa Kirundi (D.62)
- b. in-goloβe Luhya (E.32a) (< *-gòdòbè)
- c. eggulo Luganda (E.15) (< *gùdò)
- d. aa-kolooβa Bukusu (E.31) (Mutonyi p.c.)
- e. omo-goro:ba Kikuria (E.43) (Muniko 1996)

In (11a-b) the root-initial voiced velar of the proto-form has apparently metathesized with the following *b or *d over an intervening vowel. It is clear, however, that not all *gVb and *gVd forms have reflexes exhibiting metathesis. Ekegusii forms with a root-initial *g* which do not metathesize with a following *b* or *r* (< *d) are shown in (14a-c):

- | | | |
|---------|------------|-------------------|
| (14) a. | é-n-gùβà | 'shield' *gùbà |
| | é-n-gòβò | 'cloth' *gùbò |
| | é-n-gùβó | 'hippo' *gùbú |
| b. | é-n-gèrí | 'string' *gòdì |
| | číí-n-gùrù | 'strength' *gùdù |
| | é-n-gùrúè | 'pig' *gùdú |
| c. | ìyòrò | 'yesterday' *gòdò |
| | ó-kò-yòrò | 'foot' *gùdù |
| | ó-kò-yòrà | 'buy' *gùdà |

One obvious difference between (11a) and (14a) is that the reflex of root-initial *g in (11a) is preceded by a vowel whereas in a) it is preceded by a consonant. (11b) is distinguished from the forms in (14b) in the same way. It is less clear how to distinguish (11b) from the forms in (14c) where no metathesis occurs, especially as we compare (11b) *mà-ròyòβà* (< *gòdòbà) to *ìyòrò* 'yesterday' (< *gòdò). The generalization about what distinguishes (11a-b) from the forms in (14a-c) seems to be that the forms in (11a-b) have a *g which is 1: preceded by a V, and 2: followed later in the word by a *b, as illustrated schematically below.

- (15)
$$\begin{array}{ccc} V & g & V \\ 1 & 2 & 3 \end{array} \left\{ \begin{array}{l} Cxb \\ b \end{array} \right. \Rightarrow 1432$$

We refine the formalization of this below.

Let us now turn to the forms in (11c-d), repeated below.⁵

- (16) c. é-kì-ýyé 'eyelash' < *kópé
 d. rí-úyá 'bone' < *kúpà

The Proto-Bantu words have the form *kV₁pV₂ which is realized in modern Ekegusii as V₁γV₂. Again, closely related languages show no metathesis of the reflexes of these two proto-forms.

(17) *kópé 'eyelash'

- a. ɲ-gɔβɛ Kamba (E.55)
- b. ɔlɔ-gɔhɛ Logooli (E.41)
- c. lu-koβɛ Giryama (E.71)
- d. lu-gohe Sukuma (F.21)
- e. ɲ-gohe Taita (E.14d)
- f. oru-kohi Nyoro (E.11) (<*kópí)
- g. or-gohe Nyankore (E.13) (<*kópí)
- h. olu-góye Jita (E.25) (Downing 1989)
- i. ru-kobe Kikuyu (E.51) 'eyelid' (Benson 1964)
- j. eki-kowe Luganda (E.15) 'eyelid'
- k. iki-gohe Kirundi (D.62) 'eyelid'
- l. ɛkɛ-gɔhɛ Logoori (E.41) 'eyebrow'
- m. oro-koβɛ Kikuria (E.43) (Muniko 1996)

(18) *kúpà 'bone'

- a. i-fwao Hai (E.62)
- b. i-gufa Nyoro (E.11)
- c. i-guha Sukuma (F.21)
- d. li-gufwa Jita (E.25) (Downing 1989)
- e. j-gufa Kirundi (D.62) (Stevick 1965)
- f. m-fuβa Digo (E.73), Segeju (E.56) (Hinnebusch & Nurse 1993)
- g. iri-yuha Kikuria (E.43) (Muniko 1996)

(Note that $k \rightarrow f / _ ɲ$ is a regular historical process in Hai, Digo and Segeju.)

Let us begin by considering the reflexes of *p in Ekegusii. There is ample evidence that the modern Ekegusii reflex of *p is \emptyset in nearly every environment. We see examples of this below, both in cases where *p is stem-initial (19a) and stem-final (19b).⁶

- | | | | |
|---------|------------|------------------|----------|
| (19) a. | ɔ-kò-ér-á | 'to be finished' | *péd-a |
| | á-mà-éémbá | 'sorghum' | *pémbá |
| | á-'má-írá | 'pus' | *pǐdà |
| | rñ-úrɔ | 'foam' | *pǐdù |
| | é-ùnkò | 'mole' | *pùkò |
| | ó-mò-ùkò | 'blind person' | *pòkù |
| | rñ-óté | 'wound' | *púté |
| | ó-γò-àk-à | 'to rub' | *pàk-a |
| | ó-gò-ìk-à | 'arrive' | *pìk-a |
| | ó-gò-ét-á | 'pass' | *pít-a |
| b. | ɔ-kò-bɔ-á | 'bind' | *bóp-a |
| | ó-mò-kìà | 'vein' | *kǐpà |
| | ɔ-γò-kéè-à | 'be small' | *kéép-a |
| | ɔ-kò-rèè-à | 'be deep' | *dèèp-a |
| | ó-gò-túùà | 'be blunt' | *túúp-a |
| | ó-kò-ìdàrà | 'take off fire' | *yǐpud-a |

Before a sequence of *iV or *jV, *p becomes a voiced palatal fricative as seen in (20). (Cf. Digo *igi-su*, Giryama *ki-śu* for 'knife' and Nyankore *-sy-*, Rundi *-śy-* for 'be burnt'.)

- | | | | |
|---------|-----------|------------|-------|
| (20) a. | ó-kò-žy-á | 'be burnt' | *pí-a |
| b. | ó-mò-žyó | 'knife' | *pǐú |

In these forms I assume that *i glided before a following vowel and that the *p became ž before y.

After a nasal, *p sometimes became *b and sometimes deleted.

- | | | | |
|---------|------------|----------|-----------|
| (21) a. | é-ṁ-m-béś | 'wind' | *ny-pépò |
| b. | é-'ny-íyó | 'kidney' | *ny-pǐgù |
| | é-ny-iĩmbó | 'stick' | *ny-pǐmbó |

I would like to propose that the difference between the retention versus the deletion of the bilabial stop is conditioned by the following vowel. In a variety of related languages where the reflex of *p is generally Ø, it mutates rather than deletes before *j (and *y). This is true, e.g., in Meru, Hai, and Sagala among others (Guthrie 1967). To account for (21b) I assume that in Ekegusii *p became ž before both y (cf. (20a)) and i. Subsequently, ž lost its frication after a nasal, nž becoming ny (and then perhaps [ñ]). (E.g., *ny-pǐgù 'kidney' > nžíyó > nyíyó.) Remaining ž's disappeared, except before a glide, as attested synchronically in (20). (E.g., *pǐk-a 'arrive' > žík-á > ík-a; but *pí-a 'burn' > py-á > žy-a.) In the case of (21a), like many neighboring languages, Ekegusii *mp sequences become mb (Cf. Logoori, Hanga, Kamba among others; Guthrie 1967)). Of course, given the above proposal, this post-nasal voicing neutralization would occur after *p > z.⁷

There is a single somewhat anomalous case where *p appears to have a y reflex in modern Ekegusii.

- | | | | |
|------|------------|----------|--------|
| (22) | ó-mw-ìyàwà | 'nephew' | *yǐpúa |
|------|------------|----------|--------|

After the process which turns the *u to w (conditioned by the following vowel), the form in (22) could be accounted for by a rule which changes *p to g (> y) before w, as given below.⁸

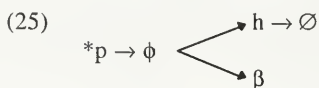
- (23) *p → g / __ w

In other related languages, the presence of a derived glide also conditions a different reflex of *p than the one normally found elsewhere. For instance, Kikruia is similar to Ekegusii in that *p is realized as h, however in this form the velar is found, *umwiiywa*. In Logoori, the reflex of *p is generally h, however before a glide we find φ (*yǐpúa > *omwǐφwa* 'uncle'). However one ultimately formalizes this process, it doesn't seem possible to formulate it such that it would account for a change from *p to y in the forms in (11c-d). First, this wouldn't account for the absence of the root-initial velar, and second, it does not seem possible to formulate a trigger for this change in (11c-d) while still accounting for the deletion of *p in similar environments, as seen in (19b).

Let us now briefly consider the fate of *p in closely related languages. These are given below.

(24) a.	Nyankore (E.13)	h
	Luganda (E.15)	w,y ⁹
b.	Kerewe (E.24)	h
	Jita (E.25)	h
c.	Hanga (E.32)	h
d.	Logoori (E.41)	h
	EKEGUSII (E.42)	∅
	Kikuria (E.43)	h
	Nata (E.45)	h
e.	Kikuyu (E.51)	h
	Embu (E.52)	β
	Meru (E.53)	∅
	Kamba (E.55)	β
	Daiso (E.56)	∅
f.	Rwo (E.61)	∅
	Hai (E.62)	∅
	Kahe (E.64)	6
	Gweno (E.65)	∅
g.	Pokomo (E.71)	φ
	Giryama (E.72)	h
	Kauma (E.72)	β
	Taita (E.74)	∅
	Sagala (E.74)	∅

A possible scenario of historical changes of *p which would account for the vast majority of these reflexes is given in (25).



Whatever the exact changes were, it seems quite likely that *p eventually became some sort of fricative, ultimately h, as a shared innovation involving Ekegusii and closely related languages. This was then followed by a wholesale loss of that fricative in Ekegusii. It is unclear whether the loss of the fricative in Meru, Daiso and others was a shared innovation or (and perhaps more likely) whether this happened independently in several languages. To conclude this point, if the change from *p to h is a shared innovation with closely related languages, but metathesis is not (as it is found only in Ekegusii), then we hypothesize that *p > h preceded metathesis. We return to this below.

Let us now turn to the realization of *k in (11c-d). Since we have fairly good evidence of some type of metathesis process operating in (11a-b), let us consider the possibility that some type of metathesis process involving *k is also

at work in (11c-d). Ordering *h* (< **p*) deletion sequentially with some sort of metathesis yields two possibilities, both yielding the same output, as outlined below.

(26)	*kópé	*kúpà	Proto-form
	kópé	kúpá	Vowel and Tonal (V&T) changes
	kóhé	kúhá	* <i>p</i> > <i>h</i>
	kóé	kúá	<i>h</i> > Ø
	óké	úká	Metathesis of <i>k</i> and <i>V</i>
(27)	*kópé	*kúpà	Proto-form
	kópé	kúpá	V&T-changes
	kóhé	kúhá	* <i>p</i> > <i>h</i>
	hóké	húká	Metathesis of <i>h</i> and <i>k</i>
	óké	úká	<i>h</i> > Ø

In order to achieve the attested VCV output of (11c-d), in) the metathesis process would need to affect the *k* and the following *ɔ* or *u*, while in) it would affect the two consonants (over an intervening vowel), as it seems to do in (11a-b).

4. Dahl's law

The first thing we note about the scenario presented in (27) is that both orderings yield a form in which the velar is voiceless, whereas in the modern Ekegusii form it is voiced. That there is no general process which would voice a velar between vowels can be seen in the following.

(28)	ó-kò-rók-á	'to vomit'	*rúk-a
	éè-n-čóké	'bee'	*júkì
	ó-βò-tàkà	'poverty'	*tākà

How, then, did the velar become voiced? The analysis we will pursue here is that the voicing is a result of a well known voicing process which occurred in certain Bantu languages (confined to the northwest corner of the Bantu speaking area) known as Dahl's law. Dahl's law is the name of a dissimilatory process which, in its most general form, voices the first of two voiceless obstruents (which, of course, are always separated by an intervening vowel). According to Guthrie 1967, languages which show some effects of Dahl's law are found within his Zone's E20-E50, F20 and G60.

Bennett 1967, Davy & Nurse 1982 and others have clearly demonstrated that languages vary a great deal as to which particular consonants undergo the rule, which consonants trigger the rule, and how the rule effects multiple targets within the same word. Languages also differ as to whether there is any evidence that the rule is operative synchronically. According to Guthrie 1967, languages in which **p*, **t*, and **k* were historically affected include Logooli (E.41), Luyha (E.32), Kerebe (E.24) and Sukuma (F.21). In other languages, a smaller subset of sounds was affected. Only **p* and **t* are affected in Hehe (G.62), only **p* is affected in Kinga (G.65), and only **k* is affected in Kikuyu (E.51) and Embu

(E.52). In Ekegusii, there is robust evidence that Dahl's law affected *k diachronically.

(29)	ó-kò-γès-à	'harvest'	*kèc-a
	ó-kò-γòt-à	'be old'	*kòt-a
	ó-kò-γwáàt-à	'hold'	*kɣáat-a 'sieve'
	á-mà-γókó	'crust'	*kókò
	ó-mò-γáàkà	'old man'	*kàaka 'grandfather'

That this voicing process was triggered by a following voiceless consonant and did not apply across the board historically to root-initial velars can be seen below.

(30)	ó-βò-kímá	'porridge'	*kímà
	rñ-kóβù	'navel'	*kúbù
	ó-βò-kómbé	'hoe'	*kómbè
	ó-γò-kám-á	'to milk'	*kám-a

This process is still quite productive in the synchronic phonology of Ekegusii as exemplified by the class 15 prefix /ko-/ in the forms below.

(31) a.	ó-kò-ròt-à	'dream' (v)
	ó-kò-γòrò	'foot'
	ó-kò-nyw-à	'drink'
b.	ó-γò-káàn-à	'deny'
	ó-γò-túùà	'be blunt'
	ó-γò-sèkà	'laugh'

Dahl's law did not affect *p, *t or *c in Ekegusii, as seen below.

(32) a.	ó-γò-àk-à	'rub'	*pàk-a
	ó-gò-ìk-à	'arrive'	*pìk-a
	ó-gò-ét-á	'pass'	*pít-a
b.	ó-γò-tákúnà	'chew'	*táku
	ó-γò-twéèkà	'put up'	*túík-a
	ó-bò-tàkà	'soil'	*tàkà
c.	ó-γò-sèkà	'laugh'	*cèk-a

Assuming, then, that *k became voiced through Dahl's law in (11b-c), let us reconsider the historical derivations in) and) with an eye to ordering Dahl's law among the other historical processes. In order to insure that the *k of c-d) is voiced, Dahl's law must apply before both *h-Deletion and Metathesis. If *h-Deletion applied before Dahl's law, the trigger of Dahl's law would be lost.

(33)	*kópé	*kúpà	Proto-form
	kópé	kúpá	V&T-changes
	kóhé	kúhá	*p > h
	kóé	kúá	h > Ø
—	—	—	Dahl's law
	*óké	*úká	Metathesis of k and V

If metathesis applied before Dahl's law, it would be the h (< *p) (instead of the *k) which was the target of voicing.

(34)	*kópé	*kúpà	Proto-form
	kópé	kúpá	V&T-changes
	kóhé	kúhá	*p > h
	hóké	húká	Metathesis of h and k
	hóké	húká	Dahl's law ¹⁰
	*óké	*úká	h/h > Ø

That Dahl's law must apply before both *h-Deletion and Metathesis, then, accords with the fact that both h-Deletion and Metathesis seem to be relatively recent innovations, not being shared with related languages, whereas Dahl's law is a shared innovation of quite a number of languages. Let us now consider the ordering of *p > h. As this was a shared innovation, let us assume that it is ordered before metathesis (as well as h-deletion, of course). The remaining question is how it is ordered with respect to Dahl's law. Both possible ordering yield the same output as shown below.

(35)	*kópé	*kúpà	Proto-form
	kópé	kúpá	V&T-changes
	kóhé	kúhá	*p > h
	γóhé	γúhá	Dahl's law
(36)	*kópé	*kúpà	Proto-form
	kópé	kúpá	V&T-changes
	γópé	γúpá	Dahl's law
	γóhé	γúhá	*p > h

After the application of Dahl's law and *p > h, metathesis and *h-deletion will apply. The correct modern-day forms can be generated with either ordering, although what metathesizes is different in each case as shown below.

(37)	γóhé	γúhá	Result of Dahl's law and *p > h
	hóγé	húγá	Metathesis of g and h
	óγé	úγá	*h > Ø
(38)	γóhé	γúhá	Result of Dahl's law and *p > h
	γóé	γúá	*h > Ø
	óγé	úγá	Metathesis of g and following V

There are two reasons to think that the best analysis is the one in (37). First, metathesis of two consonants over a vowel parallels what is going on in (11a,b) where no CV metathesis analysis is possible. The second reason is the existence of forms such as the one in (39), where *g does not metathesize with a following V.

(39)	ó-kò-γwà	'fall'	*gù-a
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5. Providing a formal account

We note here that not all *k ... p sequences metathesize. Those that do not are listed in).¹¹

(40)	a.	ó-mò-kìà	'vein'	*kìpà
	b.	ś-γò-kéè-à	'be small'	*kéép-a

These forms, where the root-initial *k does not get voiced, contrast minimally with the forms in (11c-d) where we assume Dahl's law has applied, and therefore preclude an analysis where, e.g., every *kVp undergoes Dahl's law becoming gVp which would feed p > h and metathesis yielding hVg which becomes Vg after h-deletion. Such a scenario is not possible due to the fact that the initial voiceless velar undergoes Dahl's law in (11c-d), but not in (40a-b). How can this be accounted for?

I will now present and evaluate four possible analyses which account for the differing behavior of (11c-d) with respect to (40a-b), ultimately adopting the final one. I will suggest that it is the quality of the vowel between the two consonants (specifically roundness) which plays a role in differing behavior of the two sets of forms.

First, one could assume that *p (> h) did not trigger Dahl's law in Ekegusii at all (i.e., Dahl's law would only be triggered by the reflexes of *t, *k and *c). This would directly account for the forms in (40). However, another explanation for the voicing of *k in (11c-d) would then have to be found. Yet it is unclear how this could be accomplished short of combining the voicing *k in these cases with the already unusual metathesis process. The likelihood and phonetic plausibility of this scenario must be compared with alternatives to be presented below.

The second and third possible analyses directly exploit the difference in the vowels which occur in (11c-d) as opposed to those in (40). Specifically, the former are back rounded vowels while the latter are front unrounded vowels. In the second possible analysis, *p triggers Dahl's law only when the intervening vowel is a rounded (or alternatively back) vowel. This would explain why *k voices in (11c-d), but not in (40). Metathesis would then only apply when γ (as opposed to k) is the first consonant.

(41)	*kópé	*kúpà	*kìpà	*kéép-a	Proto-form
	kópé	kúpá	kìpà	kéépà	V&T-changes
	kóhé	kúhá	kìhà	kééhà	*p > h
	γóhé	γúhá	—	—	Dahl's law
	hóyé	húyá	—	—	Metathesis
	śyé	úyá	kìà	kéèà	h-deletion

However, we must now ask whether it is possible to maintain this second hypothesis on comparative grounds. Are there other languages affected by Dahl's law where under certain circumstances *p (or a reflex) is not an automatic trigger? Let us consider three languages in this regard (as described by Guthrie 1967-70:1) Logoori (E.41) where *p, *t, and *k are targets, 2) Kikuyu (E.51)

where, like Ekegusii *k is the only target, and 3) Hanga (E.32) where *p and *k are targets.

In Logoori we find that *p triggers Dahl's law for *p, *t, and *k, as shown in).

(42)	a.	βɛh	'wipe'	*píp
	b.	ɔβɔ-dɔhɛ	'mud'	*tòpè
	c.	ɔlɔ-gɔhɛ	'eyelash'	*kópé

In Kikuyu, we find that while *k voices when the following consonant is *t, *c or *k, it fails to voice before *p.¹²

(43)	a.	mɔ-ɣatɛ	'bread'	*kàté
		ɣeek	'put across'	*kífk
		ɣɛð	'harvest'	*kèc
	b.	mɔ-kiha	'vein'	*kìpà
		kùhɛ	'short'	*kùpí

In Hanga, we find that *p triggers Dahl's law for *p, but not for *k.

(44)	a.	olu-βaha	'wing'	*pàpà
	b.	ikwaha	'armpit'	*kú-ápà

We see, then, that while *p behaves regularly with the other voiceless obstruents in triggering Dahl's law in some languages (e.g., Logoori), there are certainly cases where *p acts exceptionally in not triggering Dahl's law, in contrast to the other voiceless obstruents which do trigger it (e.g., Kikuyu). In the one case where *p sometimes triggers this process and sometimes does not, the determining factor is the place of articulation of the target consonant, and not the intervening vowel. Thus, while this second analysis, where Dahl's law applies over certain vowels, but not others, makes the correct predictions in Ekegusii, it finds no precedent elsewhere in Bantu.

This brings us to the third possible analysis, in which the backness (or roundness) of the vowel does not figure in triggering Dahl's law directly, but rather figures in the process in which h (< *p) is deleted. Specifically, one way to account for the facts is to assume that not all h's were deleted simultaneously, but rather that h's were deleted in two stages. The first, preceding both Dahl's law and metathesis, would only delete h's after front (or alternatively unrounded) vowels. The second rule, following Dahl's law and metathesis, would delete all remaining h's. This is illustrated below.¹³

(45)	*kópé	*kùpà	*kìpà	*kéép-a	Proto-form
	kópé	kúpà	kìpà	kéèpà	V&T-changes
	kóhé	kúhá	kìhà	kéèhà	*p > h
	—	—	kìà	kéèà	Post-front V h-del
	ɣóhé	ɣúhá	—	—	Dahl's law
	hóyé	húyá	—	—	Metathesis
	óyé	úyá	—	—	h-deletion

It should be pointed out here that it is unclear in Ekegusii, as it is in other Bantu languages, exactly how Dahl's law developed historically. The process is uncommon enough that it certainly seems like a shared historical innovation in the Bantu languages which exhibit it. What seems less clear, however, is what form the process originally took. It is quite possible, for instance, that Dahl's law originally involved only a single trigger and target (e.g., *k ... *k) and that as time went on this was generalized in different ways in the various daughter languages. In the case of Ekegusii it is possible that the voicing of *k before *k (and perhaps before *t and *c, as well) happened before Post front V h-deletion (or even concurrently with it). Thus, the above scenario does not depend on every subpart of Dahl's law applying after Post front V h-deletion, but only the process in which h (<*p) comes to act as a trigger.

Under the assumptions of the second and third analyses, the sounds undergoing metathesis are a root-initial γ and an h. Let us now attempt to combine the formulation of this process with the one taking place in a) where γ is metathesized with b over an intervening vowel. The forms in (11a, c, d) could be accounted for by an SPE style rule such as the following:

$$(46) \quad \begin{array}{cccc} V & \gamma & V & \{\beta, h\} \rightarrow 1 \ 4 \ 3 \ 2 \\ 1 & 2 & 3 & 4 \end{array}$$

Let us review the various parts of this rule. That metathesis only occurs when the first C is preceded by a vowel is demonstrated by the forms in). That the first consonant is γ , and not (for example), any velar, can be seen by considering the following.

(47)	rî-kóβù	'navel'	*kúbù
	é-rì-kòβè	'vegetable'	*kùbì

That the trigger cannot be any consonant, but rather must be either β or h, can be seen by examining the following.

(48)	ó-kò-gèèndà	'go'	*gènd
	ó-kò-gòrà	'buy'	*gùd
	ó-mò-gàndò	'story'	*gàn
	ó-bò-gìrà	'life'	*gìrà
	ó-kò-gòrò	'foot, leg'	*gùdù
	á-mà-gútá	'oil'	*gútá
	ó-kò-gàčà	'keep'	
	ó-kò-gànyà	'wait'	
	ó-kò-gòòkà	'be happy'	
	ó-kò-gósóryà	'play'	

(For evidence that metathesis did not apply to all instances of *k changed to γ by Dahl's law, see (29).)

Characterizing β and h to the exclusion of the other consonants is not a trivial matter. What distinguishes β and h articulatorily from the other Ekegusii consonants is that no part of the tongue is used in their articulation. In terms of

boiling this down to SPE features, we could employ [coronal, -high]. We can therefore revise (46) into (49).

$$(49) \quad \begin{array}{c} V \quad \gamma \quad V \quad [-\text{cor}] \rightarrow 1 \ 4 \ 3 \ 2 \\ \quad \quad \quad [-\text{hi}] \\ 1 \quad 2 \quad 3 \quad 4 \end{array}$$

In terms of more modern notions of feature geometry (Clements 1985, Clements 1989, Clements & Hume 1995), it seems difficult to characterize β and h as a natural class, as β involves the use of the LABIAL articulator, while h is characterized by the lack of any PLACE node. This, then, is perhaps a drawback of this analysis.

In a fourth possible analysis, the roundedness of the vowels preceding h in (11c-d) spread onto the h , making it phonologically rounded, as illustrated in (50).¹⁴ In this case, roundedness would be executed by a LABIAL node, making β and h^w (M) a natural class.

$$(50) \quad \begin{array}{c} V \quad h \\ \quad \swarrow \\ \quad \text{LAB} \end{array}$$

Metathesis, then, could be said to operate on a γ and a following non-nasal consonant with a LABIAL node.¹⁵

$$(51) \quad \begin{array}{c} \text{LAB} \\ | \\ V \quad \gamma \quad V \quad C \\ | \\ [-\text{nas}] \\ 1 \ 2 \ 3 \ 4 \rightarrow 1 \ 4 \ 3 \ 2 \end{array}$$

Under this analysis, which posits an intermediate stage with two variants of h (determined by the roundness of the previous vowel), there would actually be no need for two h -deletion rules, something which had to be employed in the third analysis to explain why Dahl's law was triggered in some kVh forms, but not others. In this fourth analysis we can assume that only obstruents with a PLACE node (i.e., labialized h 's, but not plain h 's) triggered Dahl's law.

$$(52) \quad \text{Dahl's law} \\ k \rightarrow \gamma / \text{---} V C \\ \quad \quad \quad [-\text{vd}] \\ \quad \quad \quad | \\ \quad \quad \quad \text{PLACE}$$

This is illustrated below.

(53)	*kópé	*kúpà	*kǽpà	*kéép-a	Proto-form
	kópé	kúpà	kǽpà	kéépà	V&T-changes
	kóhé	kúhá	kìhà	kéèhà	*p > h
	kóh ^w é	kúh ^w á	—	—	h-labialization
	ýóh ^w é	ýúh ^w á	—	—	Dahl's law

$h^w\acute{\gamma}\acute{\epsilon}$	$h^w\acute{\gamma}\acute{\alpha}$	—	—	Metathesis
$\acute{\gamma}\acute{\epsilon}$	$\acute{\gamma}\acute{\alpha}$	$k\grave{\alpha}$	$k\acute{\epsilon}\grave{\alpha}$	h-deletion

I note here that the place of articulation requirement on the trigger in Dahl's law is not unusual, as we noted earlier that Dahl's law often has strict place requirements on the trigger and/or the target obstruents. It bears pointing out again here that Dahl's law could have actually begun to operate prior to the $*p > h$ and h-labialization rules. For instance, it is possible that prior to these two processes, Dahl's law was in force, but, as in closely related Kikuria and Kikuyu, was triggered only by non-labials (i.e., $*t$, $*c$, and $*k$). This would explain why the k in the Ekegusii forms in (53) did not voice when Dahl's law was originally introduced. Working under this assumption, I would claim that at some point after $*p > h$, Dahl's law became synchronically one of k becoming voiced when followed by a voiceless C with a place node, accounting for the fact that the labialized h triggered the rule, but the plain h did not.

It seems, then, that the rule as formulated in (51) successfully accounts for three of the four cases of metathesis (11a,c,d). What of (11b) *mà-rògòòbà* 'evening' ($< *gòdòbà$)? In this case the non-metathesized alternate pronunciation is *mà-gòròòbà*. As mentioned earlier what seems to distinguish this form from the ones in which no metathesis occurs in (15b), repeated below as (54) is that a labial follows in the word in the former, but not in the latter.

(54)	$\imath\grave{y}\grave{r}\grave{o}$	'yesterday'	$*gòdò$
	$\acute{o}-k\grave{o}-\grave{y}\grave{o}\grave{r}\grave{o}$	'foot'	$*gùdù$
	$\acute{o}-k\grave{o}-\grave{y}\grave{o}\grave{r}\grave{a}$	'buy'	$*gùdà$

One possibility here would be to formulate the metathesis rule such that a y metathesizes with the following consonant, as long as there is a LABIAL under C-PLACE (cf. Clements 1989, Clements & Hume 1995) in the word, i.e., as long as there is a following consonant with a labial gesture, whether this gesture be the primary (i.e., β) or secondary (i.e., h^w) place of articulation. It would not be sufficient to include simply LABIAL, as the presence of a rounded vowel does not trigger the metathesis (cf. (54)). This is illustrated in (55).

(55)	DORS	C-LAB	
	V	Y	V C
	1	2	3 4 \rightarrow 1 4 3 2

To account for the fact that metathesis occurred obligatorily in (11c-d), but optionally in (11a-b), we assume that the rule was originally triggered (obligatorily) only by a voiceless consonant.

(56)	DORS	C-LAB	
	V	Y	V C
			[-vd]
	1	2	3 4 \rightarrow 1 4 3 2

For some dialects (including those spoken by my consultants) the [voicing] specification was lost as well as the requirement that the consonantal labiality be on the immediately following consonant.

6. Summary and conclusion

In this paper, I have presented synchronic data from Ekegusii which I have argued are best accounted for by positing a fairly recent diachronic process of metathesis which affected a velar and a following consonant. This is of comparative and theoretical interest, as metathesis is a fairly uncommon occurrence cross-linguistically in general and in Bantu in particular. The uncommonness is further compounded by the fact that the process is not a local one, but affects nonadjacent segments, and does not appear to be motivated by prosodic considerations (e.g., as a strategy for "repairing" ill-formed syllables created by some other process).¹⁶ In the course of formalizing this process, we examined the developments in *p and *k in the history of Ekegusii as well as the diachronic application of Dahl's law. While it is well known that place of articulation often plays a role in determining which obstruents trigger and/or undergo this process, I have suggested that the presence of a secondary articulation may also play a role. In particular, in order to explain why Dahl's law was triggered in certain reflexes of *kVp, but not others, I suggested that in the course of *p changing to h, rounding was maintained after rounded vowels, and only laryngeals with a secondary place node (LABIAL in this case) could act as triggers of Dahl's law.¹⁷

NOTES

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¹ As is the case in all Bantu languages, Ekegusii nouns are divided into various classes, which are often comprised of a singular and plural pair. The morphological marker of the class is prefixed onto the root. Ekegusii is part of the group of Bantu languages which also have a 'preprefix' or 'initial vowel'. Thus the complete morphological structure of the words to be presented is: Preprefix-Class Prefix-Root. In the interest of space, the numerical designation of the class marker will be omitted (as they have no bearing on the analysis presented), but hyphens will consistently be used to indicate these morpheme boundaries. (In the case of the noun in (6b), the -o is a deverbal nominalizing suffix.)

² All Proto Bantu forms and sounds given in this paper are taken from among the starred "comparative" forms in Guthrie 1976-71.

³ Derek Nurse (p.c.) informs me that the Gusii speaker he is currently working with also uses *ó-kò-βàγà* and *mà-rɔ̃ɔ̃βà* (the metathesized forms), but has heard *ó-kò-γàβà* and *mà-γrɔ̃ɔ̃βà* (the unmetathesized forms) used. For (11c-d) only *é-kì-ɔ́yé* and *rí-'ú́yá* are possible.

⁴ All forms from other languages are taken from Guthrie 1967-70 unless otherwise noted.

⁵ In Kikuria, a very closely related language, the verb 'build' has two possible pronunciations: *gahaacha* and *-hagaacha* (Muniko et al. 1996). It is not entirely clear whether these represent differing dialects of Kikuria, or whether they might be in free variation for some speakers. The Ekegusii infinitival form for this word is *oko-agaacha*. It seems quite possible based on these forms that the proto form for 'build' for Proto-Ekegusii/ Kikuria might be **kapaac*. If so, then this form would be an additional example of the type of metathesis witnessed in forms (11c-d). Why it is that this form would have a variable pronunciation in Kikuria in contrast to the cognates for (11c-d) which do not remains a mystery.

⁶ I simply note here, but do not have an explanation for the apparent metathesizing of the two vowels in 'blind person'. I.e. from **pòkù* we would expect the reflex to be *òkù* not *ùkò*.

⁷ Interestingly, this change from **mp* to *ny* (before *j*) does not appear to occur in any of the closely related languages. E.g., In Logoori the reflex of **ny-pjgù* 'kidney' is *empjgò*. A different possibility for explaining the forms in (21b) would be to assume that these stems were originally in some other noun class of the shape CV. The **p* would eventually delete, leaving vowel-initial stems. If these stems subsequently found their way into class 9, where the subject marker is a palatal nasal, the current synchronic forms would be explained straightforwardly. In the case of **pìmbò* 'stick', this scenario seems possible as some related languages (e.g. Nyooro, Nyankore) have this stem in class 11/10. After the class 11 marker *ro-* (<**du*) the reflex would be *imbò*, which might then eventually replace the root in the class 10 form. Unfortunately, this scenario seems less likely for **pjgù* 'kidney' which seems to always occur in 9/10 in closely related languages.

⁸ It should be noted that the process in (23) in all likelihood affected some subsequent development of **p*, e.g. *φ* or *h*. These intermediate changes are discussed further below in the text.

⁹ Disregarding complications that arise if **p* is found after a nasal or **j*, it becomes *y* before *i*, and *w* elsewhere. (When not morpheme peripheral, **p* becomes *s* before **j* (Hyman p.c.).)

¹⁰ Perhaps Dahl's law would simply not apply here to create a voiced laryngeal of which there is no language internal or comparative evidence. This does not seem to be at all crucial as the next rule eliminates the laryngeal altogether.

¹¹ Additionally, no heteromorphemic *k...p sequences undergo metathesis (something which would have given rise to synchronic alternations). E.g. *ó-kò-ár-á* 'to scratch' (< ú-ku-pád-a), *ó-gò-ét-á* 'to pass' (< ú-ku-pít-a).

¹² This is also true in Kikuria.

¹³ Another variation of the development in (45) would be that *p > ϕ , after which ϕ deletes only after front V's. Dahl's law would then be triggered by ϕ . Subsequently $\phi > h$, followed by metathesis and h-deletion.

¹⁴ Thilo Schadeberg has suggested to me that rather than positing a rule which changes all *p's to h, followed by a rounding process, one could alternatively assume that when *p (or ϕ) became a laryngeal it simply retained its labialness (manifested as rounding) after rounded vowels and immediately or subsequently lost it after unrounded vowels. In either case what is crucial for my argument is that a distinction arose between a labialized and nonlabialized h.

¹⁵ One issue which arises here is the phonological structure of NC sequences. No metathesis occurs between a velar and a following prenasalized labial. E.g., *ó-mò-gààm̀bì* 'leader', *é-gààm̀bo* 'conversation'. If NC is represented as two segments, then the rule in (51) will suffice. If NC is represented as a single complex segment, then further specification of the trigger C in (51) will be necessary (e.g. that it is [+continuant] or [-nasal]).

¹⁶ One process (both diachronically and synchronically) within Bantu dubbed "imbrication" (Bastin 1983) is often analyzed as a kind of metathesis, but in that case the metathesizing elements are strictly adjacent. E.g., Ekegusii /tu-a-kaberek-an-ire/ 'we just carried each other' → *twakaberekaine*, where the final $V_1C_1-V_2C_2V_3$ becomes $V_1V_2C_1V_3$, the C_1 and V_2 having been permuted.

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